PATENT SPECIFICATION (11) 1 487 986

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(21) Application No. 26624/75 (22) Filed 23 June 1975 (19)
(31) Convention Application No. 7 501 480 (32) Filed 17 Jan. 1975 in
(33) France (FR)
(44) Complete Specification published 5 Oct. 1977
(51) INT. CL.² E02B 3/04
(52) Index at acceptance
E1H 15

(54) IMPROVEMENTS TO MODULAR ELEMENTS FOR CONSTRUCTING HYDRAULIC AND SUBAQUEOUS STRUCTURES

(71) I, MAURICIO PORRAZ JIMENEZ LABORA, a Mexican citizen, of Gutenberg No. 47 8o. Piso, Mexico 5, D.F., Mexico, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement: —

The present invention relates to modular elements for constructing hydraulic and subaqueous structures as described in my copending British patent application No. 44152/74 (Serial No. 1485470). The expression "hydraulic" is used to refer to structures which control, direct or channel flowing water.

These elements are formed by a flexible envelope which is provided with valve devices which enable the element to be filled, at the point where it is to be used, with a solid material (a mixture of sand and cement) which is injected under pressure.

The flexible envelope has the advantage that, when the element is placed in position, it is able to adapt to the configuration of the bed and to other elements which are already in position.

However, in certain applications, due to the way in which the flexible envelopes deform when filled under pressure, and in particular when the filling material is a quick-setting cement, the final shape assumed by the elements is not the one best suited for their function in the structure which is planned.

The present invention proposes to overcome or minimize this drawback and to give the element the final shape required, without at the same time losing the advantages which result from the flexibility of the envelope, and while providing the additional advantage of pre-stressing the filling substance to a certain extent.

Accordingly, the invention consists in a modular constructional element comprising a flexible envelope having an inlet valve for admitting a solidifiable fluid substance under pressure, said envelope also being provided with elongated reinforcing members which are expandable to create pressure on said substance until the substance is finally solidified.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show some embodiments thereof by way of example and in which: —

Figure 1 is a partly cut-away perspective view of a modular constructional element which is provided with reinforcing and pre-stressing means arranged between opposing side-walls of its envelope,

Figure 2 is a side-view of a modular constructional element the envelope of which is provided with members for confining its transversely, and

Figure 3 is a side-view, partly in cross-section, of a modular constructional element provided with internal reinforcing members and with a detachable external fitment for protecting these members.

Referring now to the drawings, in Figure 1, the element consists of an envelope 1 made of a flexible material, which is intended to hold cement or some other fluid solidifiable filling substance which is represented by the dots 2. This substance is introduced under pressure through an orifice 3 which is fitted, as described in the aforementioned specification, with a suitable valve.

Elongated reinforcing members 4 are fixed between the opposing walls of the envelope. These members may possibly form an integral part of the envelope if the material is such as to allow them to be produced when the envelope is moulded. The length of the members 4 when not under load is less than the corresponding inside dimension of the envelope when in the expanded state, and they are formed from a material having high mechanical strength which is capable of sufficient extension to allow the envelope to expand to a certain degree when the filling material is introduced under pressure. The result is that members 4, by virtue of their mechanical strength and elasticity characteristics, restrict and modify the way in which the element deforms when filled while increasing its mechanical strength.

Furthermore, a pre-stressing action is

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig. 1

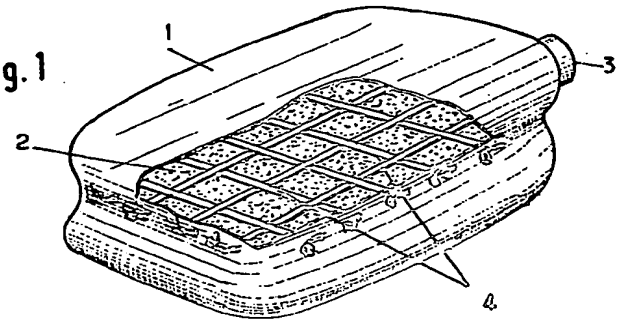

Fig. 2

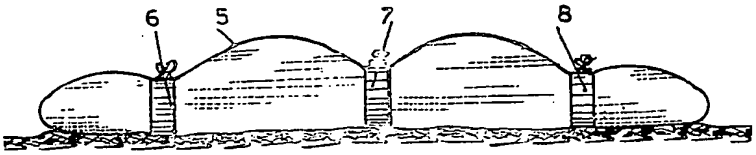

Fig. 3